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# Soviet Agricultural Transport: Bottlenecks To Continue [redacted]

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**A Research Paper**

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# Soviet Agricultural Transport: Bottlenecks To Continue

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**A Research Paper**

This paper was prepared by
Office of Soviet Analysis.
Comments and queries are welcome and may be directed to the Chief, Economic Performance Division, SOVA,

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# Soviet Agricultural Transport: Bottlenecks To Continue

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**Summary**

*Information available as of 30 September 1986 was used in this report.*

Soviet agricultural losses are likely to remain large for the foreseeable future because of the poor quality of rural transportation facilities and inadequate investment resources to improve them. Failure to sharply reduce these losses will cut the net gain from recent initiatives in the agricultural sector—the intensive technology effort and improved feeding practices—and keep the USSR in foreign grain markets. Indeed, the ability to offload and transport large quantities of imported grain is the one area of agricultural transport that has been substantially improved in recent years.

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Although Moscow's current policies are not sufficient to solve the agricultural transportation problem—particularly on or near the farm—in the 1980s (and probably the 1990s), General Secretary Gorbachev is at least starting the process of change. For example, the moderate effort to expand rural roadbuilding and greater efforts to improve trucking and railroad service will strengthen the foundation for small increases in food supplies in the coming years, even in the absence of production increases. Moscow should be able to make considerable progress in improving the transport of domestic agricultural goods from major processing points and into urban areas in the next few years. Investments are already being made in the production of large trucks and truck-trailer combinations for off-farm haulage, specialized railroad cars for grain and fertilizer, and refrigerated rolling stock for perishable produce and livestock products.

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The new equipment will reduce the drag of agricultural shipments on overall transport performance. To make the most of the equipment, however, the Soviets must aggressively develop parallel infrastructure, such as specialized loading and unloading equipment at transfer points and sufficient storage capacity both at transfer points and at main storage locations.

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Such improvements are especially important now because Gorbachev's 1986-90 plan promises farms substantially larger quantities of agrochemicals, equipment, and other needed production resources. Although the agricultural sector has received a large share of transport resources in the past, growth in transport capacity has failed to keep pace with its increasing demands. Transport carriers are already struggling to ship the growing volumes of industrial materials necessary for modern and efficient agricultural production.

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Even if more resources reach the fields and output is increased, the large losses caused by inadequate transportation and storage—now some 20 percent of agricultural output—could prevent substantially larger quantities of farm products from reaching the consumer's table. Indeed, emphasis in the 1986-90 plan on producing more high-quality but perishable foods—such as meat, fruits, and vegetables—presents an even greater challenge to the transport system than bulk crops such as grain.

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We attribute the majority of these losses to the insufficient quantity and poor quality of rural roads and poor vehicle servicing capabilities in rural areas. More generally, chronic problems of poor work incentives and inadequate investment in rural infrastructure are to blame. Although Gorbachev is committed to increasing investment in rural infrastructure, the overall needs are so vast that even strong emphasis on transportation will only bring slow progress in reducing losses. Even though Moscow claims each ruble invested in rural roads brings a 4-ruble return, a massive infusion of resources would be required over the short run to improve the roads; probably tens of billions of rubles ultimately will be necessary to make real headway. Rural areas are not in a position to finance this kind of investment themselves, and the Kremlin is unlikely to take on such a major task since its limited investment funds are already earmarked for the high-priority machine-building and energy sectors.

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Agriculture has only about half the number of trucks Soviet planners feel are required. Nonetheless, the sector already controls about one-fifth of the nation's trucks and commands even more during the harvest season—including some of the military's. Moreover, high turnover of the truck stock, partly because of poor roads and limited servicing, has led to an even greater demand for new trucks and intense competition with other truck claimants.

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Agriculture has not been able to obtain a larger share of deliveries over the past decade because developments in the trucking industry have emphasized production of heavy trucks for other users. For example, plans for modernizing the Gor'kiy Motor Vehicle Plant—whose vehicles make up two-thirds of the agricultural fleet—slipped in priority behind those for plants producing trucks for other uses over the last 10 years. The regime may have concluded that fielding new, more efficient trucks for agriculture was not prudent because achieving the intended productivity gains also requires improvement of rural roads. Moscow now intends to carry out the long-awaited modernization at Gor'kiy. The speed with which this program is implemented will be a good indicator of the Kremlin's dedication to rural development.

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# Soviet Agricultural Transport: Bottlenecks To Continue

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## The Increasing Burden of Agriculture on Transportation

Since the mid-1960s, agriculture's high priority has resulted in a preferential claim on transport resources. Leonid Brezhnev's decision in late 1964 to bolster agriculture's priority for investment and material resources led to a large and growing demand for transportation services. This has resulted in a major drain on the nation's transport resources—particularly vehicles and fuels.[1] Increasing deliveries of machinery and agrochemicals over the last two decades, often from distant producers, expanded the need for long-distance hauling by rail, and increasing applications of chemical fertilizers and pesticides added to the demand for trucks. For example, deliveries of chemical fertilizers to agriculture quadrupled from 1965 to 1985, while the use per hectare of land sown to grain rose by roughly seven times. Gains in farm output have also added to the burden on transportation, albeit much less rapidly than deliveries of industrial materials to the farms.[2]

Agricultural shipping now accounts for about 10 percent of all rail shipments (tons originated) and 16 percent of rail traffic (ton-kilometers) nationally (see table 1). Every fourth ton of freight shipped on the highways is for the agro-industrial complex, and one-third of all highway traffic is agricultural.

Agriculture's burden on transport carriers is even greater than these statistics imply. *Long rail hauls,* particularly for grain and fertilizer, now average about 1,000 kilometers (km) and involve a large number of stations, yards, and men in forwarding shipments. Such shipments also tie up scarce rolling stock for long periods of time. Agricultural cargoes also require *special handling* far beyond that required for bulk industrial raw materials, which account for the greatest share of rail traffic and a large share of highway haulage. Some goods—such as grain—are highly combustible and require extra caution in loading and unloading. Other products—such as fruits and vegetables—are easily bruised or damaged. All agricultural goods require high standards of vehicle cleanliness to avoid contamination. Finally, the *seasonality* of agricultural production concentrates shipments into brief periods. According to the Soviet press, 38 to 40 percent of all agricultural rail shipments occur during September to November, compared with only 15 to 16 percent in May to July. Nearly half of all agricultural highway shipments occur in July to September and one-fourth during October to December. In years of high crop yields—for example, 1976, in which grain production increased by 80 million metric tons over 1975—the burden becomes almost unmanageable.

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The agricultural sector in the USSR is immense, claiming roughly one-third of total annual investment (including housing and services) and employing nearly 30 percent of the labor force.[3] Farm production alone claims about 20 percent of annual investment and 20 percent of the labor force in comparison with less than 5 percent of each in the United States. The USSR farms about one-third more land than does the United States, but the value of output per hectare in the USSR averages only 56 percent of that in the United States.

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[1] The productivity of additional transport resources dedicated to agriculture has been low. Rail and highway shipments for the so-called agro-industrial complex (including shipments to as well as from agriculture) increased by about 120 percent and 160 percent, respectively, between 1965 and 1985. In contrast, farm output (net of feed, seed, and waste) increased by only 35 percent during the same period—and high-priority grain output by only about 70 percent.

[2] Deliveries of industrial goods to agriculture—largely machinery, equipment, and agrochemicals—were equivalent to roughly 12 percent of the gross value of agricultural output (GVO) in 1959 but accounted for an estimated 25 percent by 1982. In absolute terms, deliveries of industrial goods and services grew by nearly four times. In addition, the estimated share of farm output being industrially processed increased from 40.4 percent of GVO in 1959 to 53.3 percent in 1982. In absolute terms, its value more than doubled, from 31 billion rubles in 1959 to 68 billion rubles in 1982. Adding to on-farm transport needs was a 60-percent increase in the value of farm production used internally, much of which is livestock feed and seed. These shares are estimated from input-output data (only available for benchmark years) and Soviet statistics on GVO in comparable prices.

[3] The agricultural sector includes not only farms but also several branches of industry supplying farms with materials, such as tractors and other farm machinery, repair services, and agrochemicals, and branches of industry that process farm products.

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**Table 1**
**USSR: Total and Agricultural Transport Volumes, 1983** [a]

| | Total | Railroad | Highway | River | Maritime |
|---|---|---|---|---|---|
| Traffic (billion ton-kilometers) | 5,251 | 3,600 | 486 | 273 | 892 |
| Of which: | | | | | |
| Agriculture | 883 | 580 | 171 | 12 | 120 |
| Shipments (million metric tons) | 31,121 | 3,851 | 26,425 | 607 | 238 |
| Of which: | | | | | |
| Agriculture | 7,144 | 376 | 6,700 | 38 | 30 |
| Materials | NA | 176 | 4,000 | 30 | NA |
| Of which: | | | | | |
| Fertilizer | NA | 138 | NA | NA | 8 [b] |
| Products [c] | NA | 200 | 2,700 | 8 | NA |
| Of which: | | | | | |
| Grain | NA | 135 | NA | 7 | 20 |

[a] Derived from *Narodnoye khozyaystvo SSSR v 1984,* pp. 335, 338, 342, and various Soviet open-source publications such as *Izvestiya Timiryazevskoy sel'skokhozyaystvennoy akademii,* No. 4, 1985, p. 5.
[b] Includes other agricultural chemicals.
[c] Farm production in the USSR averages roughly 1 billion tons annually. Many of these products, particularly feedstuffs, are moved at least twice, substantially raising the tonnage figures.

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**Table 2**
**USSR: Estimated Truck Deliveries to Major Claimants, 1966-85**

*Thousand units*

| | 1966-70 | 1971-75 | 1976-80 | 1981-85 |
|---|---|---|---|---|
| **Total** [a] | **2,207** | **3,040** | **3,636** | **3,866** |
| Military [b] | 612 | 868 | 993 | 1,038 |
| Civilian [c] | 1,595 | 2,172 | 2,643 | 2,828 |
| Common carrier [d] | 191 | 341 | 383 | 424 |
| Agriculture [e] | 717 | 1,102 | 1,342 | 1,450 |
| Other [f] | 687 | 729 | 918 | 954 |

[a] Production minus net exports.
[b] Estimated.
[c] Total minus estimated military.
[d] Data for 1966-70 and 1971-75 are from Bronstein and Shulman, *Ekonomika avtomobil'nogo transporta,* Moscow: Transport, 1976, p. 79. Data for 1976-80 were calculated as the mean of reported data for 1971-75 and estimated data for 1981-85. Data for 1981-85 were calculated as civilian deliveries minus the total of agriculture and other.
[e] Data for 1966-70, 1971-75, and 1976-80 are from *Ekonomicheskaya gazeta,* No. 33, August 1982, p. 1. Data for 1981-85 are from *Planovoye khozyaystvo,* No. 6, June 1986, pp. 17-26.
[f] Data for 1966-70, 1971-75, and 1976-80 were calculated as civilian deliveries minus those to common carriers and agriculture. Data for 1981-85 were calculated from estimates of deliveries to departmental carriers minus deliveries to agriculture; the departmental figures were derived from one claim that departmental carriers represent 85 percent of the total (probably civil) truck fleet (*Voprosy ekonomiki,* No. 3, March 1982, pp. 42-53).

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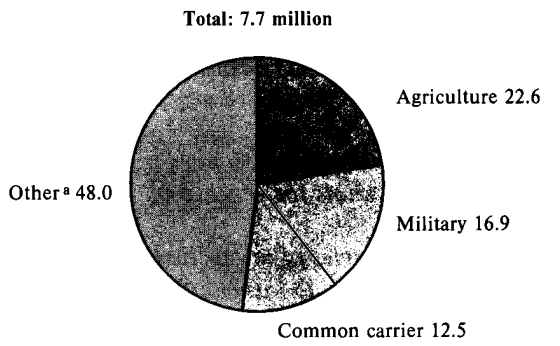
**Figure 1**
**USSR: Estimated Truck Inventory by Major Claimant, 1985**

*Percent*




[a] Includes the main industrial ministries and the construction sector.

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Agriculture's 1.7 million trucks represent more than one out of every five in the country (see figure 1). Some two-thirds are on farms, and the remainder are in organizations supplying and servicing farms and processing farm products. The sector receives an even larger share of truck deliveries than its inventory share would imply because trucks are retired more rapidly in the agricultural sector than in other sectors. We estimate that, during the 1981-85 period, agriculture received one-half of all trucks delivered to the civilian economy (see table 2). According to a Soviet automotive industry journal, however, only some 90 percent of these deliveries are new trucks. The remaining 10 percent probably include used military trucks, perhaps left on farms after being used in the harvest.

The agricultural sector also consumes much of the nation's petroleum products—diesel fuel, gasoline, and motor oils. Soviet authors estimate that, in the early 1980s, the sector absorbed 40 to 45 percent of the total diesel fuel, 30 to 35 percent of the gasoline, and up to 50 percent of the motor oils. Nontransport farm operations and farm production probably account for most of the diesel fuel and some of the motor oil, but much of the gasoline goes for trucking operations. The enormous tonnages moved to and from the farm, as well as on the farm, suggest that transport may claim as much as half of the total agricultural allocation of oil products. According to the Soviet press, the agricultural sector will continue to receive 30 percent of the country's gasoline and 40 percent of the diesel fuel in support of the Food Program.[4]

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Despite the large volume of transport resources devoted to agriculture, the administration of these resources—especially of trucking—has been diffused among several more or less autonomous organizations (see inset), and development of the rural transport network has not kept pace with the growth in demand. This has given rise to bottlenecks that from time to time require special effort by the military and industrial sectors to overcome. During the harvest season, for example, agriculture's claim on the national truck fleet reportedly swells by 700,000 to 800,000 vehicles, drawing them away from other sectors.

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**The Cost of Inadequate Transport Facilities**

The main cost of agriculture's overtaxed and underdeveloped transport system is the enormous loss of farm products and inputs that occurs during transportation and storage. For example, in 1982, Brezhnev noted that losses of grain run as high as 20 percent of the annual harvest. This is equivalent to 90 percent of the average annual volume of grain imported during 1981-85. An article in *Literaturnaya gazeta*—a Soviet periodical known for provocative writing—noted that losses of fruits, potatoes, and other vegetables "along the way" amount to 30 to 50 percent of the

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[4] The Food Program, announced by Brezhnev in 1982, aims to improve the entire chain of food production—from farm, through processor, to consumer.

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***Transportation Players***

Railroads *dominate the long-distance haulage of raw materials and equipment from producers to agricultural areas; of agricultural products from procurement sites to centralized storage, feeding, or processing locations; and of processed foods to distributors. The All-Union Ministry of Railways has some control in balancing the needs for agriculture against other transport claimants, as well as planning, procuring, and delivering the right mix of rolling stock—from specially lined freight cars for hauling caustic fertilizers to refrigerated cars for meat and other perishables.*

Trucks *predominate over shorter distances on or near the farm. Unlike the rail system, the truck system is highly fragmented; management and subordination are vested in a number of entities:*

- Glavagropromsnab, *the Main Administration for Technical Supplies and Services, was formed in late 1985 as part of* Gosagroprom, *the State Agro-Industrial Committee, in which Gorbachev merged six major entities. The full details of its structure are not yet known but it appears to include at least the following two organizations:*
  - Goskomsel'khoztekhnika, *the State Committee for the Supply of Production Equipment for Agriculture, largely controls deliveries of machinery and equipment, fuel, construction materials, and most other supplies to farms. Local* Sel'khoztekhnika *organizations operate trucks and loan them for farm use.*
  - Soyuzsel'khozkhimiya, *formed in 1979, combined farm and* Goskomsel'khoztekhnika *elements to create a unified, specialized service to store, deliver, and apply agrochemicals. Although several republics now have* Agropromsnab *departments, oblast and rayon level (smaller administrative units)* Sel'khoztekhnika *and* Sel'khozkhimiya *departments are currently operating under their original names.*
- *State and collective farms, which maintain large truck inventories, are responsible for most on-farm shipments and deliveries to procurement areas.*
- *Processing enterprises also have truck fleets and haul raw materials for processing.*
- *Republic ministries of motor transport supply trucks and drivers to farms and processing enterprises when needed. They also reportedly provide centralized operational control of the many trucks, drivers, and mechanics traditionally supplied by industry and the military to meet the brief but great need for additional transport during the harvest.*
- *RAPOs, the regional agro-industrial associations set up under the Food Program, reportedly also provide some weak administrative coordination of these many transport authorities.*

*With so many players and conflicting ministerial ties, it is not surprising that, during peak periods, harvested crops continue to spoil because the promised transport is busy "someplace else."*

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River carriers *are underdeveloped and largely insignificant as carriers of agricultural products, although they do move agricultural produce from the Caucasus area to population centers along the Volga and Don River systems.* Maritime carriers *also are relatively unimportant for moving domestic agricultural freight, although imports of agricultural products—particularly grain and raw sugar—represent a sizable share of the total shipments and traffic of the maritime fleet.*

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***Product Losses***

*Determining the extent of farm product losses attributable to transportation is difficult. Even Soviet statisticians are unsure of the extent and causes of these losses. In addition to transport constraints, product losses can be the result of:*

- Lack of processing capacity. *Low investment priority has kept the food-processing industry from adding sufficient capacity to handle the increasing quantities of raw materials coming from the farm and from reequipping facilities with modern machinery. Many steps in food processing are still performed manually.*
- Lack of proper storage facilities. *Currently, agriculture has only 36 percent of the storage space it requires, according to an authoritative Soviet journal. The priority of grain vis-a-vis other crops is evident in Soviet statements that nearly 70 percent of the storage capacity needed for grain has been built. Figures for potatoes and other vegetables and for fruit are only 32 percent and 47 percent, respectively. According to the Soviet technical press, proper storage facilities—those that are air-sealed and effectively prevent spoilage—exist for only 40 percent of silage and haylage, key livestock feeds.*
- Lack of incentives. *Little connection exists between effort expended and reward gained—personal initiative is not encouraged, and a sense of personal responsibility is nonexistent.*
- Shortages of crates and containers. *As many as 12 loading and unloading operations occur between harvesting and delivery to the processor or consumer. Substantial waste results from excessive handling and delay.*
- Shortages of labor. *Farm managers are loath to send workers with trucks to carry goods beyond the farm when they could more profitably be employed on the farm. Receiving points traditionally are undermanned and also suffer from a lack of automated materials-handling equipment.* 25X1

25X1 *agricultural losses much lower than the general statements; average product losses at the "stage of delivery of raw materials to processing," presumably those that could be attributed to transportation, comprise 6.6 percent, and losses of livestock, grapes, and vegetables, 10 to 12 percent. Rates as low as these suggest a very limited definition of the delivery stage. The US Department of Agriculture estimates that about 20 percent of all fresh fruits and vegetables picked in the United States never reach the consumer because of losses related to natural ripening and aging, stresses such as chilling, and insects and micro-organisms. Losses of grain attributable to transport are estimated to be less than 1 percent in the United States.*

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harvest. The author described trucks loaded with fruit standing idle for days and "juice running in the street."

Gorbachev himself described the potential payoff from reducing agricultural losses in his report to the 27th CPSU Congress when he noted that the cost of eliminating losses would be one-half to one-third the cost of obtaining the same supply through additional production. In June 1986 he stressed the need to "take in without losses" all crops, and, in September, during his walkabout in Krasnodar, he repeated the importance of reducing losses to the success of the Food Program. Losses are caused by a number of factors, especially inadequate transport and storage, which are interdependent (see inset). 25X1 25X1



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The distance that products have to move is a major factor. Now retired Minister of Agriculture Valentin Mesyats, in an interview last year, commented that, when tomatoes are moved 25 km, 80 to 85 percent remain in first-grade condition; when the distance is 100 km, only 40 percent do. Farm produce being moved by rail frequently takes as much as 15 to 18 days to reach the delivery point, according to Soviet authorities. Milk often has to be moved 200 km or farther, even in hot weather, and cattle and hogs being shipped to slaughter spend as many as three to four days in transit. Refrigerated and ventilated railcars and trucks are in short supply, and the use of chemical preservatives is prohibited by Soviet law.

Product losses also extend to farm inputs. Failure to deliver adequate quantities of agrochemicals, machinery, spare parts, and other crucial resources to farms on time seriously hampers achieving gains in crop output. Not only are deliveries frequently too late to enable field work to progress, but, according to the Soviet press, the quantities finally delivered are often less than needed—partly because of losses en route and partly because of production constraints. Moreover, storage facilities for key materials such as chemical fertilizers are inadequate. Construction of new storage facilities has scarcely kept pace with steadily increasing allocations. In 1983 a Politburo discussion pointed out that only half as many depots for chemical fertilizer storage existed as were needed and that about one-tenth of the fertilizer allocated to agriculture—over 2 million tons in nutrient content—was being lost. Soviet scientists claim that each ton of fertilizer nutrient produces 4 to 5 tons of grain.

Inadequate storage facilities at farm supply organizations and on farms contribute to problems resulting from the highly seasonal nature of chemical fertilizer shipments. More than half of these shipments are concentrated in the March-May period for use with emerging winter crops and spring plantings. At this time the movement of fertilizer competes for rail space and general purpose freight cars with the seasonal surge in rail activity from delayed winter shipments and the annual peak of shipments of construction materials. A second peak occurs in November-December, also a difficult period for the railroads as they try to meet end-of-year delivery targets.

## The Main Problems

### Inadequate Roads

An inadequate road network probably tops the list of causes for agricultural losses by the transport system (see figures 2 and 3). One Soviet writer in the early 1980s blamed "lack of roads"—probably meaning both inadequate quantity and quality—for 5 to 7 billion rubles in agricultural losses annually, or 4 to 5 percent of the gross value of farm output as measured by the USSR. Another blamed "lack of roads" for crop losses equivalent to 7 to 8 percent of the gross value of crop output. Despite a longstanding policy aimed at encouraging rural roadbuilding, the USSR reported that 11 percent of regional centers and 18 percent of collective and state farms in 1985 still had no reliable link to the main road system.

Increasing the traditionally low priority for off-farm roads in rural areas would be difficult. Construction and maintenance of off-farm roads are controlled by the republic ministries of highways or their subordinate trusts, which are already fully employed improving the inadequate stock of general purpose roads connecting larger population centers.[5] Moreover, for over 25 years the responsibility of financing rural roads has been placed mainly on the rural areas, primarily on the farms themselves, which cannot meet this extra burden, given their heavily strained resources.

Yet, even if the Soviets increased the resources devoted to off-farm rural roads, the problem of losses would be far from solved. A large share of the losses probably results from the poor condition of on-farm roads. A deputy chairman of the RSFSR Council of Ministers claimed in a 1986 article that his republic

[5] There is no all-union ministry of highways, but the major interrepublic road network—the Soviet equivalent of the US defense highway system—enjoys national support for funding and priority for materials. Although most of the roads in this system are hard surfaced, many of them are only two lanes wide.



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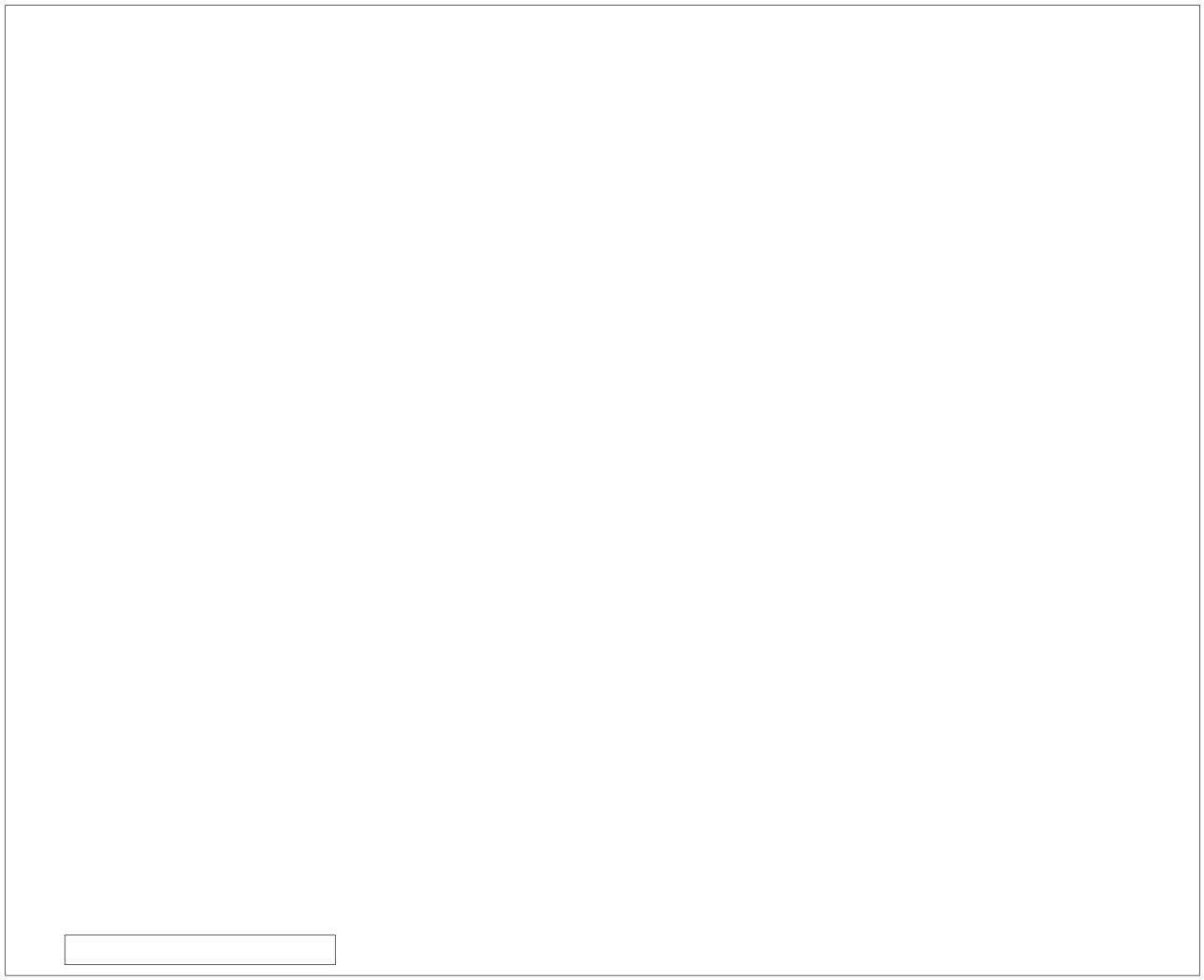

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had 480,000 km of roads within farms, which is far short of the 1.2 million km of on-farm roads the Soviets claim are necessary in the republic.[6]

[6] On-farm roads are far more important in the USSR than in the United States. The average state farm in the USSR covers over 16 thousand hectares, and the average collective farm about 6.5 thousand hectares, as compared with average farm size of about 180 hectares in the United States. A state or collective farm may include several villages, some with schools and other amenities, such as small hospitals, farm-product processing facilities, and other small-scale industries to produce construction materials and consumer goods from local raw materials.

Upgrading the road system on farms is a problem of enormous magnitude. Only 59,000 km of the farm roads in the RSFSR are hard surfaced.[7] The need for hard-surfaced roads on RSFSR farms—estimated by

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[7] "Hard surface" in Soviet parlance includes nearly any improved surface beyond dirt. More than 80 percent of Soviet public roads have been raised to this level. The Soviets use the more exclusive term "modern surface" when surfaces are composed of concrete or asphalt. Less than half of all public roads qualify for this description.

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the Soviets at 600,000 km—exceeds the total stock of hard-surfaced roads in the entire republic today. It is also greater than the additions to the stock of hard-surfaced roads nationally over the last 15 years, during which Moscow made a major effort to improve the national road system. Resources for rural road construction are decentralized, making rapid improvement similar to the national experience highly unlikely.[8]

Development of hard-surfaced roads not only is important for reducing losses but also for reducing costs of both inputs and products. For example, a Soviet author claims that the use of hard-surfaced roads instead of unsurfaced roads in rural areas increases the amount vehicles can haul by 80 percent, increases speed by a factor of 2 to 3, cuts fuel expenditures in half, and greatly reduces expenses for vehicle repair.

The lack of adequate hard-surfaced roads is particularly apparent in the flooded and boggy conditions that prevail during the annual spring thaw. Although few crops are moved at this time, supplies must be delivered to farms; feed to animals; and live animals, milk, and eggs to procurement and processing points. According to the Soviet central press, "at times there is nothing we can do about impassable roads, all transport stands still except for a few powerful tractors."

**Shortages of Transport Equipment**

Agricultural losses also result from an inadequate supply of transport equipment in good repair. Although the inventory of trucks in the agricultural sector increased between 1970 and 1984 by nearly 600,000, to almost 1.7 million—or about three trucks per 1,000 hectares of arable land—this is still less than half the number that Soviet planners consider necessary to avoid delays. Moreover, the rugged treatment that trucks undergo because of poorly surfaced or unsurfaced roads reduces the number in working order. Difficulties in maintaining farm trucks compound the problem. The nationwide shortage of vehicle spare parts, repair and maintenance facilities, and qualified repair personnel is far more pronounced in rural areas than in cities. Farm trucks reportedly are out of operation an average of at least 40 days each year because of inadequate repair or servicing. 25X1

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Many Soviet articles have focused on the supply of inappropriate, broken, or otherwise unusable railway and highway rolling stock for shipping agricultural products and the misuse of specialized agricultural rolling stock. The problems have sparked numerous cartoon commentaries depicting freight cars and trucks spewing grain through gaping holes or of livestock and even logs being loaded into cars designated for grain (see figure 4). *Sel'skaya zhizn'*, the agricultural newspaper, reported that, during 1982 in one area of the Ukraine, grain spillage equaled 1 kilogram per running meter of track "as far as one could see." Fertilizers and fuels also leak in substantial quantities from railcars. These problems arise mainly from a lack of cars specially suited for shipping bulk agricultural products and from improper conversions of general purpose freight cars to agricultural use. For example, workers often fail to install grain panels before the cars are loaded. A chronic lack of refrigerated trailers and railcars reduces quality and increases spoilage. According to Soviet estimates, only about half of all rail-shipped perishables are moved in refrigerated equipment. 25X1

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Transport also has been blamed for losses that affect agriculture indirectly, for example, in the shipment of raw materials to and output from fertilizer producers.[9] One Soviet official lamented in 1982 that since 1976 a total of 8 million tons of chemical fertilizers had been lost because transport capacity was not available. Inadequate loading capacity at ports on main rivers, inadequate rail support, and insufficient storage were 25X1

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[8] The chief of the Main Administration for Capital Construction in the RSFSR Ministry of Agriculture in 1980 commented that responsibility for only 20 to 25 percent of the total volume of road construction on collective and state farms fell to organizations of the republic highway ministry, which have the best network for supplies of material, equipment, and skilled manpower. The rest of the work—financing, material acquisition, and physical construction—fell on the shoulders of the republic Ministry of Agriculture or on the farms themselves.



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Grain cars being loaded with logs (left) and livestock (right).

Misuse of refrigerated trucks: *"And you get to the consumer on your own feet!"*

Poorly equipped trucks promote grain losses.

***Figure 4. USSR: Commentaries on agricultural transportation***

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reportedly to blame. Soviet open sources during the same period confirm such problems. As recently as mid-1985, a fertilizer complex in Belorussia that produces 50 percent of the USSR's potassium fertilizer was operating at only one-third capacity because railcars were not available to ship its product.

**Inefficient Use of Trucks and Fuels**

The Soviet press condemns agriculture for its inefficient use of trucks and fuels. We estimate that the agricultural truck fleet is only about half as productive as the centrally directed common carrier fleet in terms of annual per-truck shipment volumes and probably less productive than the other notoriously inefficient departmental carriers.[10] This stems in part from the long downtimes caused by rugged treatment and poor maintenance, which also contribute to excessive fuel use. According to one Soviet author, unit fuel consumption (grams of standard fuel per ton-kilometer of traffic) by agricultural trucks is double that of the common carrier fleet and 30 percent higher than that of other departmental carriers.

In addition, past policies that focused on steadily increasing the stock rather than on the productivity of trucks have not encouraged efficient use of available truck parts. Finally, the emphasis on developing large, centralized facilities for processing agricultural products and on transferring short-haul transport from rail to truck has added to the length of truck hauls, further reducing productivity. In 1982 Gorbachev (as the Politburo member responsible for agriculture) declared that rational siting of meat-processing facilities would preclude shipment of animals more than 150 km. Present facilities, however, are irregularly distributed, and animals are often transported "literally thousands of kilometers." Soviet authors blame centralization also for longer hauls of feeds, fertilizers, and equipment. In the Ukraine, for example, the average haul for agricultural equipment and supplies was 40.4 km during 1981-83, as compared with only 23.5 km in 1966-70.[11]

**Coping With the Problems**

**The Official Line**

Gorbachev has not provided a specific agenda for dealing with the problems of agricultural transportation, but his major speeches and his 1986-90 economic plan indicate he is committed to at least coming to grips with the problems.[12] In his report to the 27th CPSU Congress in February 1986 and again in his address to the Central Committee in June 1986, Gorbachev ratified his predecessors' commitments to reducing agricultural losses. Furthermore, many of his speeches indicate that he intends to more aggressively attack the problem of rural infrastructure, especially by increasing investment in the so-called nonproductive sphere. The most frequent item mentioned in this connection is rural housing, but the rural road system also would be a major beneficiary. Finally, the 1986-90 plan clearly continues support for the broad transport directions outlined in the Food Program, particularly deliveries of new transport equipment to agriculture and the development of rural transport (see inset).

Despite the consistency with which many of these same policies have been restated over the years, the record of Gorbachev's predecessors in improving overall agricultural transportation has been poor. This has been because of the sheer vastness of the problem, particularly in rural areas. Even a major effort to

[10] Departmental carriers are those owned and operated by plants or individual ministries, including agriculture-related ministries. The estimate is derived from Soviet statistics on truck shipment volumes, which we believe exclude much of the on-farm haulage of livestock feed and products such as manure that is done by both truck and tractor. Even when crudely adjusted for these hauls, the agricultural truck fleet is more inefficient than other carriers.

[11] The Soviet press reports that some progress toward reducing hauls has been made over the past few years with the construction of new processing facilities closer to production sites. But the same reports note that progress is slow.





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***The Food Program: The Transport Angle***

*Brezhnev's Food Program—promulgated in 1982—has now survived into the third regime since his death. General Secretary Gorbachev confirmed his commitment to it in a speech at a Central Committee meeting in April 1985, and the basic targets of the program have been reflected in the goals of the 1986-90 plan announced in late 1985.*

*One of the program's more important tasks is to reduce the chronic high losses of farm products, which claim as much as 20 percent of total crops. In large part, these losses result from lack of capacity for the timely harvesting, transporting, storing, and processing of farm products. If losses are not reduced substantially, gains from other provisions of the program will be undercut.*

*The Food Program deals with transportation directly by providing explicit targets for increasing the supply of specialized trucks and freight cars, other agricultural equipment, and storage facilities. The program's considerable attention to improving rural infrastructure also in part reflects Moscow's desire to reduce losses by improving farm-to-market transportation as well as by increasing on-farm storage and processing facilities. It promises increased investment in rural areas—largely to improve housing and living conditions, but also to improve agricultural productivity. Better rural roads would reduce travel time for farm workers, cut the need to use tractors for transportation, improve truck productivity, and speed up deliveries of both resources to farms and products to consumers.*

solve it would result in only moderate gains. In addition, emphasis in the 1986-90 agricultural program on producing more high-quality but perishable foods—such as meat, fruits, and vegetables—presents an even greater challenge to the transport system than bulk crops such as grain.

Gorbachev probably will be the beneficiary of moves begun by his predecessors to resolve some of the agricultural transport problems. For example, considerable improvements have been made in rail rolling stock for expediting agricultural haulage. Such measures were taken during the late 1970s and early 1980s as part of a larger program to improve overall rail service. Poor performance of the railroads contributed to a general industrial slowdown in the Soviet Union during that period. 25X1

**Policies In Practice**

***Top Priority to Expediting Grain Imports.*** Gorbachev strongly wants to reduce food imports, particularly of grain. His predecessors also shared this hope, but they nevertheless invested in improvements to handle imports, perhaps recognizing that they would always need some insurance against crop failures. Ports on the Baltic and Black Seas and in the Soviet Far East have been greatly upgraded since the commitment was made in the early 1970s to limit the impact of poor domestic grain crops on meat production by importing substantial quantities of grain. The total capacity of port offloading equipment has increased steadily, allowing imports to rise from an average of less than 4 million tons per year during 1966-70 to more than 45 million tons in calendar year 1984.[13] 25X1

The USSR felt the squeeze of limited transport facilities during the 1981/82 crop year, when a poor grain crop led to then record grain purchases from the West. Movement of the imports was hampered by inadequate support from the domestic rail system. Reports of 6- to 8-week delays for ships waiting to discharge grain were common. During the 1984/85 crop year, however, Moscow was able to handle more than 55 million tons of imports—roughly 20 percent more than in 1981/82—with relative ease. 25X1 25X1

[13] The USSR has demonstrated the capability to import an average of 5 to 6 million tons of grain per month for an extended period. 25X1

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Our analysis indicates that the temporary choke point was relieved by broad improvement in the rail transport system during the intervening years, the fielding of greater numbers of specialized grain freight cars—both new hoppers and specially equipped boxcars—to the ports, and some enhancement of port equipment. In addition, in 1984/85 much more grain was moved in larger ships—45,000 to 100,000 tons—thus reducing turnaround time and improving port productivity.[14]

Despite plans to increase domestic grain production substantially, the Soviets are continuing to improve their ability to offload and move imports from major ports. Moscow imported a substantial amount of new offloading equipment in the early 1980s to expedite grain handling either by replacing or augmenting the existing equipment. In addition, two new grain handling complexes are scheduled to come into service during the 1986-90 period. Novotallinsk—an entirely new port on Muuga Bay near Tallinn, Estonia—was scheduled to bring its first 5 million tons of annual offloading capacity into service late in 1986 at a budgeted cost of 350 million rubles. The new port will accommodate ships of up to 100,000 deadweight tons at quayside. This is two and one-half times the capacity of existing berths at Baltic ports and will enable Moscow to avoid costly transloading to smaller ships. A second new grain harbor with a capacity of 2.5 million tons is scheduled for construction at Vostochnyy, a major port under development in the Soviet Far East.

***Solving Railroad Problems.*** Gorbachev also has benefited from past efforts to improve agricultural shipments on the railroads. Although the upgrading of rail service in the late 1970s and early 1980s probably benefited the whole economy, agriculture was a major gainer primarily because of the production of new specialized rolling stock. Such improvements are continuing.

[14] In the 1981/82 crop year, the US partial embargo on grain sales to the USSR forced the USSR to rely heavily on other countries such as Argentina for needed grain. Because Argentina's grain loading ports could not handle large ships, a major portion of that grain was moved in smaller ships—averaging about 25,000 tons—which tied up Soviet port facilities and reduced unloading efficiency.

The Soviet press claims that 60 percent of grain is now delivered in specialized cars, about half in converted boxcars and the rest in hopper and other grain cars (see figure 5).[15] Gorbachev's administration is further expanding this use of dedicated equipment. According to the Soviet press, production of specialized hoppers is to increase so that all grain shipments in the future will be moved in them. The use of hopper cars—which the Soviets equip with special loading hatches on top—has reduced loading and unloading times for bulk freight such as grain and fertilizer, thus speeding up freight car turnaround times, an important factor behind improved railroad performance.

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The Soviets are also improving their stock of railcars for the shipment of perishable agricultural products. The Food Program envisaged delivery of 29,000 to 30,000 refrigerated and insulated cars during the 1980s.[16] To reach this target, planners called for an increase in domestic production of 2,000 cars over the previous 10 years, to probably 17,000 for 1981-90. On the basis of reported orders for 6,000 refrigerated cars from East Germany in 1981-85, we believe imports during the decade will reach 12,000 cars—an increase of about 1,500 cars over the previous decade. We are uncertain, however, whether domestic producers can meet their targets.

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[15] The Kremenchug Railroad Car Plant—the Soviets' main hopper-car builder—moved a new 65-ton model into production in 1976 and then replaced this model with a 70-ton model in 1982. Soviet claims indicate that capacity production will be 12,000 cars per year, which will be used for grain, chemical fertilizers, and other bulk loads. production of grain hoppers began at the Stakhanov Railroad Car Plant (also known as Kadiyevka) in 1979. In addition to new domestic production, Moscow signed an agreement in 1981 to purchase 20,000 grain cars from Romania by 1985.

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[16] Most of the Soviet refrigerated stock is provided by the twin plants Bryansk (in the Soviet Union) and VEB Waggonbau Dessau (in East Germany). By the early 1980s, these plants had delivered some 5,000 five-car refrigerated sections to Soviet railroads as well as a sizable number of individual refrigerated cars.

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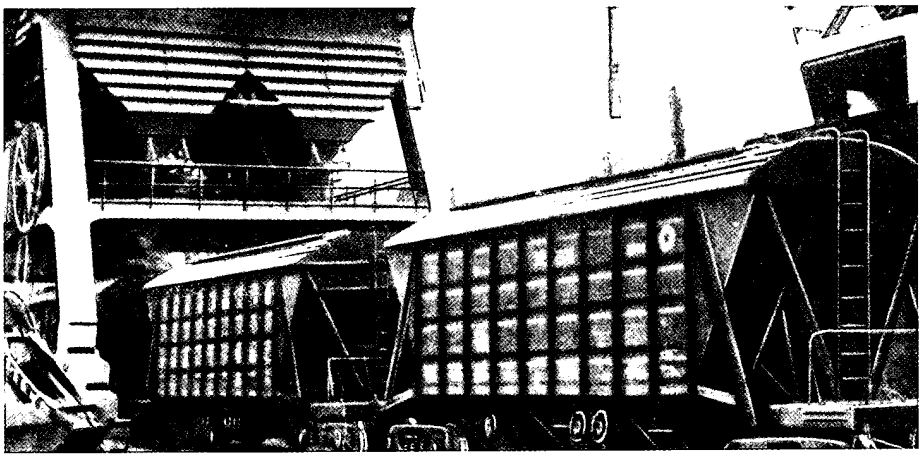
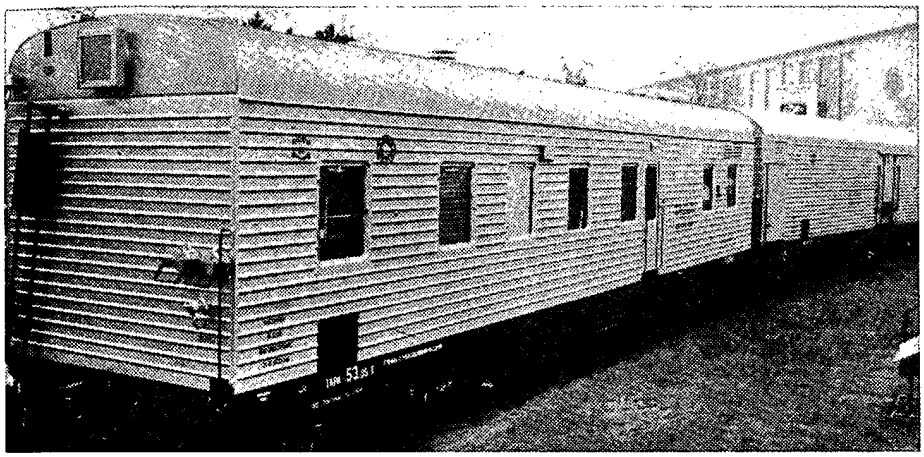


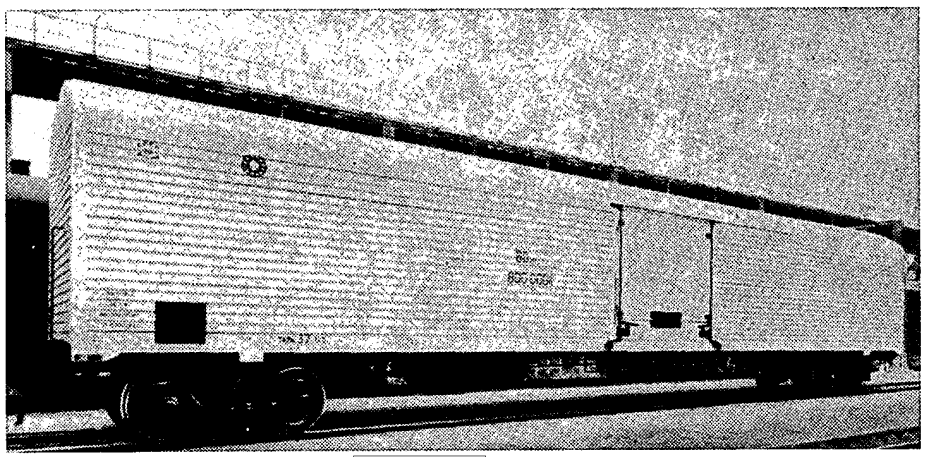
*Zheleznodorozhnyy transport* ©

Specialized grain cars are loaded quickly by automated funnels. Unloading can be fast, too, if storage or transloading areas are constructed to take advantage of their bottom dump design.



*Zheleznodorozhnyy transport* ©

To keep perishables fresh, the railways rely on five-car "refrigerator trains" – four cars for perishables and one for generator and crew.



*Zheleznodorozhnyy transport* ©

Planners believe more "stand alone" refrigeration units are needed.

***Figure 5. Freight cars for agriculture***

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Although specialized freight cars are an important ingredient for expediting agricultural shipments by rail, Gorbachev's planners must be careful now to provide the parallel infrastructure needed to make the investment pay off. For example, although there are clearly benefits to using specialized grain cars at main Soviet ports, where modern loading and unloading equipment is available, hundreds of domestic transfer stations do not have comparable machinery and equipment. One Soviet author claimed in 1983 that some 40 percent of the stations responsible for accepting "express grain trains" (dedicated unit trains) could not unload specialized hopper cars. Providing such machinery for hundreds of stations is costly. The Soviet railway newspaper, *Gudok*, notes that half a billion rubles was spent during 1981-84 to upgrade equipment at railroad stations that handle agricultural freight shipments. This is only a small share of the 19 billion rubles invested in the entire rail transportation network over the period, but it indicates that some provision was made to provide supporting infrastructure.

the Soviet open press suggest that Moscow continues to be plagued by problems in moving key agricultural inputs from industry to the farm. In particular, rail transport difficulties, which have generally subsided over the past two to three years, seem to persist for chemical fertilizer producers, probably resulting largely from belated development of specialized rolling stock. The Soviets seem to be searching for the right design and materials to build cars that can both carry corrosive chemicals and have a reasonable life expectancy at a reasonable cost. Moscow can only overcome these types of technical problems by pouring more money into domestic development of specialized cars or by importing such cars from abroad. The freight car producers to watch for such change are Bryansk for refrigerator cars, Kremenchug for specialized hoppers, Stakhanov for a wide variety of specialized models, Zhdanov for tank cars, and perhaps the new Rautaruukki freight car plant in Finland for fertilizer cars.

***Some Retrenchment on the Truck Issue.*** As the 1970s unfolded, Moscow became more concerned about resource constraints in general and, in turn, about agriculture's continued dominance as a truck claimant, especially when the needs of other, more efficient users were being shortchanged. Truck allocations to agriculture—both plans for future direct deliveries and temporary allocations at harvest time—began to change in the mid-1970s. For example, the automotive industry over the last 10 years has favored the development of heavy trucks, more appropriate for use by general purpose trucking—particularly for intercity deliveries—and the military than for agriculture. 25X1

Plans have been on the drawing board for some time to modernize the Gor'kiy Motor Vehicle Plant (GAZ), whose medium-sized trucks make up two-thirds of the agricultural truck fleet. But implementation has lagged behind other higher priority automotive projects such as construction of the huge Kama River truck plant (KamAZ) and Volga automobile plant and 25X1
the modernization of other truck factories such as the 25X1
ZIL plant. All these projects were primarily intended for nonagricultural truck production. Work on the Kutaisi truck plant, however—which reportedly will produce 20,000 heavy truck-trailer combinations for agriculture—has been pushed forward. And it appears GAZ's turn has come, according to a speech by Yuriy Khristoradnov, chairman of the Gor'kiy Oblast Party Committee, at the 27th CPSU Congress in March 1986. 25X1

The Soviet press suggests that increased use of new Kutaisi and KamAZ truck-trailer combinations will help expedite agricultural shipments. Although these trucks could improve agricultural shipping, we do not 25X1
believe the Soviets intend the vehicles to greatly

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increase agriculture's overall truck productivity or reduce its demand for trucks. The size of these rigs suggests their advantage is in moving products on relatively good roads from preliminary preparation points (for example, threshing areas some 12 to 15 km from the fields) to state receiving and processing stations and trade enterprises, an effort that represents a fairly small share of all agricultural trucking.[18] Moreover, a further limitation on the use of modern Soviet trucks for the farm was suggested by the Soviet press in 1983. New KamAZ, Kutaisi, Ural, and ZIL trucks require "intelligent operation," which "can be achieved only with an adequate material and technical base for motor transport . . . [that] most collective and state farms do not have. . . ." We interpret this to mean that these trucks require more skills to operate and maintain than did their predecessors.

Before Gorbachev's installation as General Secretary, the leadership reduced the participation of at least some nonagricultural sectors in harvest activities. The Central Committee under Konstantin Chernenko dug in its heels on the issue of military support for the harvest and apparently decreed in March 1984 that truck support to the harvest would henceforth be denied. Soviet media reported that the Politburo had spelled out certain unspecified measures to make "more rational use" of motor transport in the harvest.

Recent press claims suggest that Moscow has been partially successful in substituting civilian for military trucks, at least in Kazakhstan. In 1980 Kazakhstan's Ministry of Motor Transport reportedly supplied about 12,000 of the 80,000 additional trucks needed for the harvest; in 1985 the number had grown to 50,000 trucks. We believe a reduction in the number of trucks formerly provided by the military could account for most of this growth in civil deliveries.

[18] According to a 1980 Soviet journal article, a deputy minister of Motor Transport for the RSFSR claimed that only 140,000 to 145,000 vehicles are engaged in this part of harvest activity versus the 450,000 trucks used to haul output from harvest units to preliminary processing points. Heavy KamAZ trucks are not suited for this latter—and larger part of—harvest activity, nor for the other on-farm, nonharvest trucking that represents the greater share of all agricultural trucking.

Soviet press statistics also suggest that, in the RSFSR, an increase in truck productivity allowed a reduction in the number of trucks used in the harvest. The RSFSR, which reportedly had needed roughly 700,000 additional vehicles for the harvest, used 13 percent fewer trucks during the 1984 harvest than in 1980.[19] The amount of agricultural products hauled increased by 6 percent, while average daily shipments per truck were up nearly 20 percent.

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Although we do not foresee a major change in the share of trucks allocated to agriculture under Gorbachev, we believe the need to improve their productivity and to save light fuels will force some improvements in the structure and use of the fleet. Gorbachev's regime appears better prepared than previous regimes to do this, both on and off the farm.

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We believe production of trucks for agriculture at the Kutaisi plant will be increasing throughout 1986-90 and will be in full swing by 1990. The GAZ facility finally appears to be in line for major investment attention. The planned 1.2- to 1.4-billion-ruble facelift at GAZ will promote production of more fuel-efficient trucks with slightly larger carrying capacity. However, the GAZ reconstruction—planned to be completed by 1990—probably will suffer from chronic problems in keeping large capital projects on schedule, and we believe the odds are that it will not be finished by then. Hard currency problems may further drag out the project by preventing Moscow from getting needed equipment from the West. Still, Moscow appears to hold in high esteem the technological innovations and new truck models intended for GAZ and may take the steps necessary to ensure completion of key portions of the project. The speed with which this program is implemented will be a good indicator of the Kremlin's dedication to rural development.

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[19] The Kuban, a major grain-growing area in the RSFSR, traditionally required an additional 12,000 trucks for the harvest, but in 1986 it needed only 3,000 more, according to an authoritative Soviet journal.

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It is unclear what improvements will be made in the supply of specialized trucks intended to support expanded production of livestock products and other perishable goods. The Food Program provided specific goals for the delivery of specialized vehicles such as livestock trucks, milk tankers, and refrigerated trucks. However, the 1986-90 plan, while continuing the spirit of support for specialized highway vehicles, did not repeat these specific targets. We are uncertain whether their absence reflects deemphasis, impracticality of the original goals, or simply a continuation of the gradual reduction of published statistics on transport equipment that has taken place since 1982.

***Roads—Still a Huge Problem.*** On the issue of improving rural roads, Gorbachev faces his greatest challenge in improving agricultural transportation. Plans call for the building of 130,000 km of public roads in rural areas and 150,000 km of paved on-farm roads during the 1980s. Although we do not have comparable figures for earlier years on a national level, we believe these targets reflect a substantial percentage increase and that Moscow will have trouble reaching them. For example, during 1986-90 the construction program for hard-surfaced, on-farm roads in the RSFSR alone is said to represent a doubling of the network there. Only 53,000 km of paved, rural *off-farm* roads were to be constructed during the 1981-85 plan period—leaving some 60 percent to be completed during 1986-90. Moreover, the 1986-90 plan target for construction of paved *on-farm* roads is 92,000 km—implying that more than 60 percent of the 1981-90 goal of 150,000 km remains to be completed.[20] The lack of statistics on investment in and construction of roads precludes any assessment of progress since 1980 toward these goals.

[20] Assuming an absolute minimum definition of paved road—improved dirt with some gravel surfacing—Soviet cost estimates indicate that fulfilling goals for national rural and on-farm road construction would require an investment of at least 2 billion rubles. The sum could easily climb to four times that amount if additional grading or improved surfacing is involved. The midpoint of these estimates is consistent with planned allocations of 4.6 billion rubles for rural public road construction in 1981-85, an increase of 40 percent over 1976-80 and one-fourth of total highway investment.

Although Moscow claims that each ruble invested in rural roads provides a fourfold return in terms of decreased product loss, wear and tear on trucks, and fuel use, finding the rubles for construction, particularly in the more remote areas, will continue to be a major problem. The republic ministries of highways, key players in local distribution of these funds, appear to concentrate on road construction in and near the larger populated points. Gorbachev is calling for a 38-percent increase in investment in rural infrastructure for 1986-90 over 1981-85; but it is not clear how he will provide the funds, given the competing demands of other priority programs, especially in machine building and energy. Moscow has been trying to improve credit terms for local construction organizations—including those for on-farm roads—since at least the early 1980s. Recently, Soviet journals also have recommended that the responsibility for rural road construction be expanded from the republic highway ministries and farms to include all players in the agro-industrial complex. Road construction, however, is not just a function of rubles; it requires men, machinery, and construction materials. Probably the most serious constraints are construction materials—particularly crushed stone—and roadbuilding machinery

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Even if Gorbachev is able to pull off the planned level of rural construction, it will only be a start on solving the road problem. For example, the stock of 118,000 km of hard-surfaced, on-farm roads planned for the RSFSR by 1990 represents only 20 percent of the 600,000 km the Soviet press claims is required. Consequently, the effort to improve and expand rural roads must continue well into and probably beyond the 1990s. This kind of long-range commitment will require Gorbachev to support more thorough development of the rural infrastructure. For example, expanding the highway system multiplies the burden on rural construction organizations by creating an even larger stock of roads to be repaired and maintained. Although Gorbachev is committed to improving rural infrastructure, keeping these resources focused over a long period of time will be a major challenge to his planners.

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**Outlook and Implications**

Over the remaining years of the current five-year plan, we expect the Soviets to make considerable progress in improving off-farm transportation—at least for the products of agriculture. The preparatory investment has already been made to upgrade the rail and highway rolling stock with specialized equipment for carrying grain, perishable crops, animals, livestock products, and processed foods. However, to improve the delivery of inputs to agriculture—particularly agrochemicals—Moscow must not only improve transport but also storage capacity.

Gorbachev must now direct resources to transport problems in rural areas and on the farm. He has promised investment increases for rural infrastructure, and his 1986-90 plan for highway building emphasizes rural roads. Plans for automotive plants imply increased investment for producing trucks suited for agricultural use. Plans for nonagricultural truck production imply a shift to diesel engines, which would lessen competition for the scarce gasoline needed by most agricultural trucks. All of these "plans," if implemented, imply a real improvement in the rural transport situation.

However, as in the past when programs were developed for improving off-farm transportation, not all plans for improvements on or near the farm will be carried out. For example, the enormous investment required to upgrade rural roads is a major obstacle for the authorities. Moscow, with many high-priority claimants for centralized investment funds, may not be able to provide additional capital. Moreover, rural construction, including road construction, has always been difficult to manage because there are so many participants. The confusion of the reorganization of both the agricultural and construction sectors taking place under Gorbachev is adding to the problem.

On the truck side, although the Gor'kiy Motor Vehicle Plant—agriculture's main supplier—is next for renovation, we believe it will be difficult for Soviet planners to complete the project before the end of the decade. Moscow's more general goal of making better use of the existing truck fleet by improving the service situation in rural areas—for example, providing additional spare parts and maintenance for agricultural equipment—will also be very difficult to achieve. Indeed, providing an adequate supply of vehicle servicing facilities has yet to be tackled effectively even in major industrial areas. 25X1

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On balance, we believe the Soviets will not be able to solve their agricultural transport problems—particularly those on or near the farm—in the remaining years of the 1980s or, probably, in the 1990s. Nevertheless, even a moderate effort to expand rural roadbuilding and improve trucking and railroad service would help ease the burden of agriculture on the transport system and allow Moscow to slowly improve food supplies in the coming years, even in the absence of increases in production of farm products. 25X1

However, planners must be cautious that a restrained or uncoordinated approach to improving agricultural transportation does not backfire because of local tendencies to ignore either unenforced or incompletely laid out policy decrees from Moscow. Spotty progress, particularly if not accompanied by comparable improvements in the handling, storage, and processing of food products, would merely shift present bottlenecks from one location to another. The most likely consequence of a single-faceted approach, we believe, would be a worsening of the transport and storage network or of the crucial link between these—loading and unloading capabilities. As a result, already high losses probably would increase. 25X1

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